

Recycling of Non-ferrous Metals in India - An Update



**JOINT
STUDY GROUP'S
SEMINAR
Lisbon
4-6 Oct 2023**



***L Pugazhenthly, Executive Director
India Lead Zinc Development Association &
Past President, The Indian Institute of Metals***

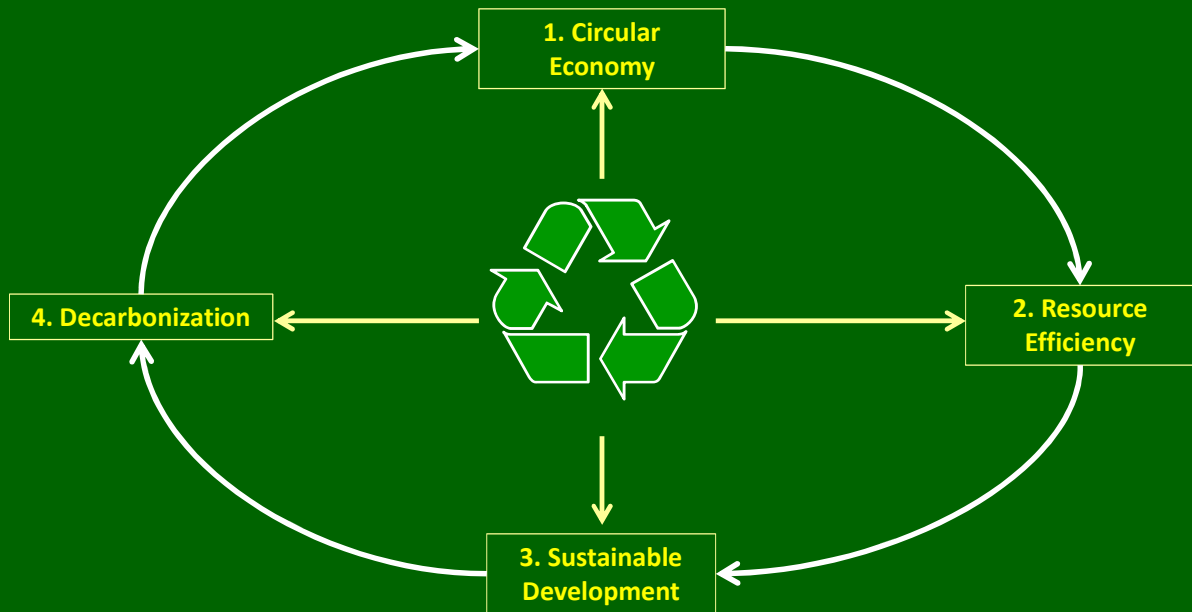
Types of Wastes Increasing



- ***Kitchen wastes***
- ***Municipal wastes***
- ***Agricultural wastes***
- ***Industrial wastes***
- ***Electronic wastes***
- ***Plastic wastes***
- ***Construction &
Demolition wastes***
- ***Bio-medical wastes***
- ***Hazardous wastes***
- ***Nuclear wastes***



Why Recycling is Inevitable?



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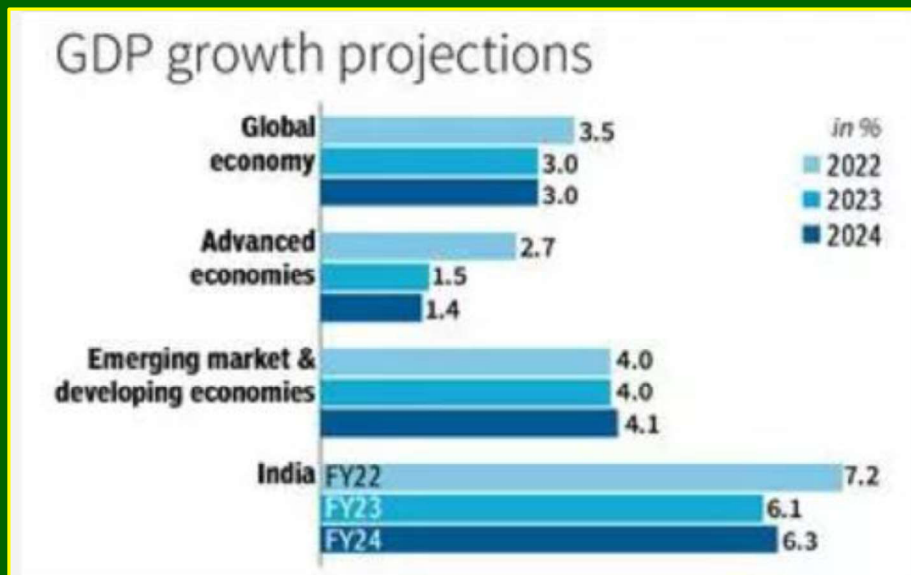
ZINC ASH Ideal Example for **Circular Economy**



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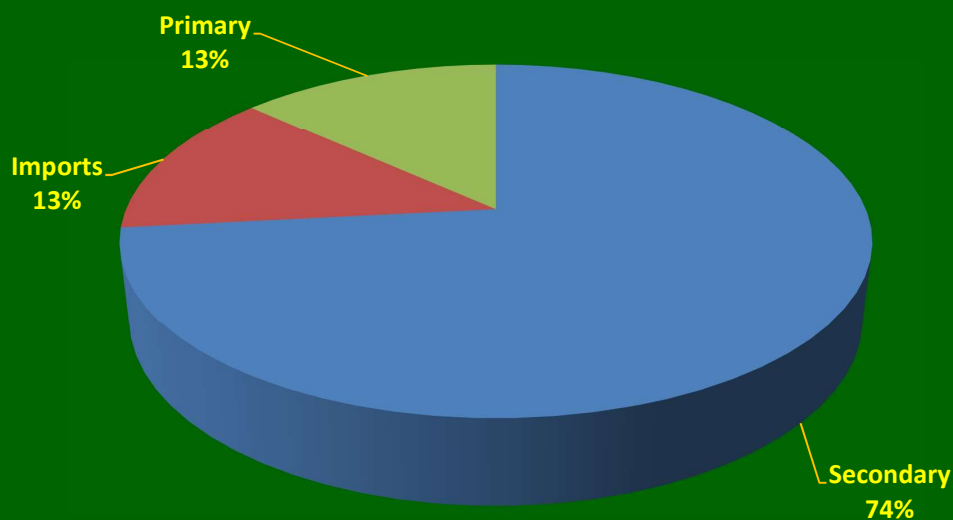
IMF

GDP Growth Projections

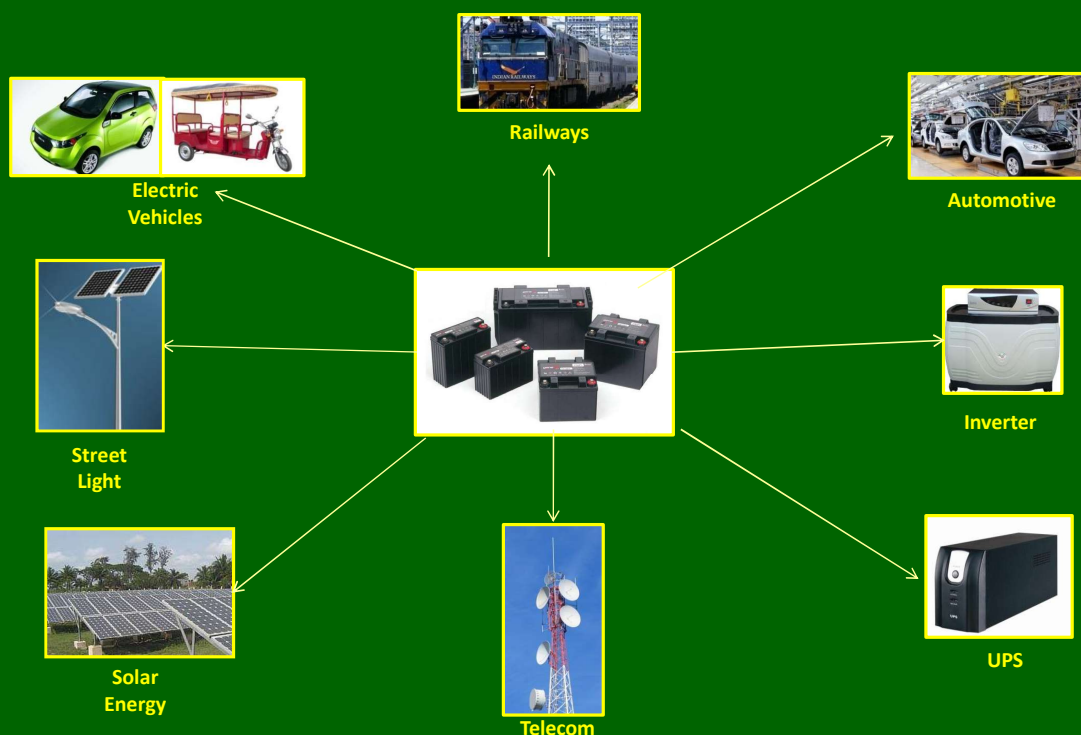


1. LEAD IN INDIA

Secondary Lead Share



Lead Battery – Touches Our Daily Lives



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INDIAN LEAD INDUSTRY

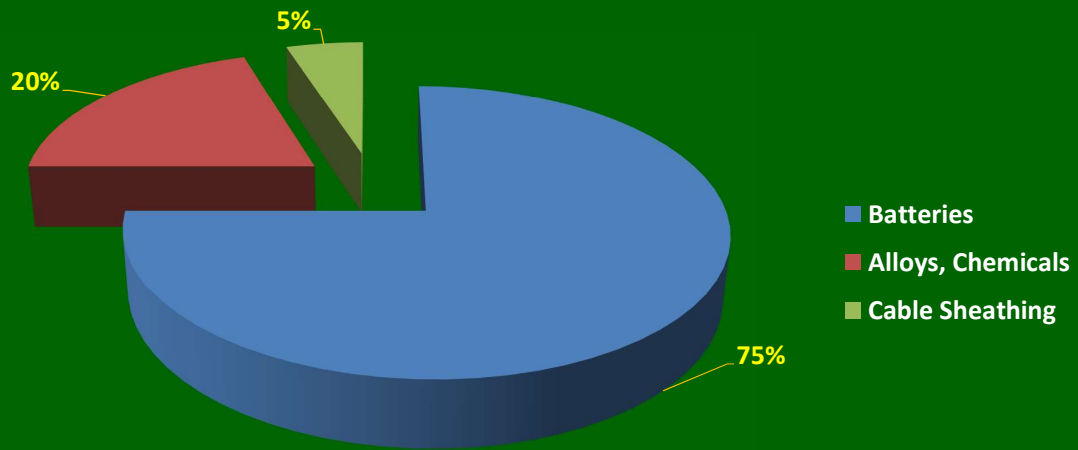
(million tonnes)

Total Lead Consumption	: 1.50 (Estimated)
Secondary Lead Production	: 1.10 (Estimated)
Primary Lead Prodn	: 0.20
Lead Imports	: 0.20

Authorized Recycling Capacity (2022)	: 3.50
No. of Authorized Units	: 625

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End Uses of Lead



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Renewable Energy Mission

Target by 2022: 175 GW



100,000 MW
OF SOLAR



60,000 MW
OF WIND



5,000 MW
OF SMALL HYDRO



10,000 MW
OF BIO ENERGY

Target By 2030: 450 GW

Ultra Mega Solar Park



Wind Energy

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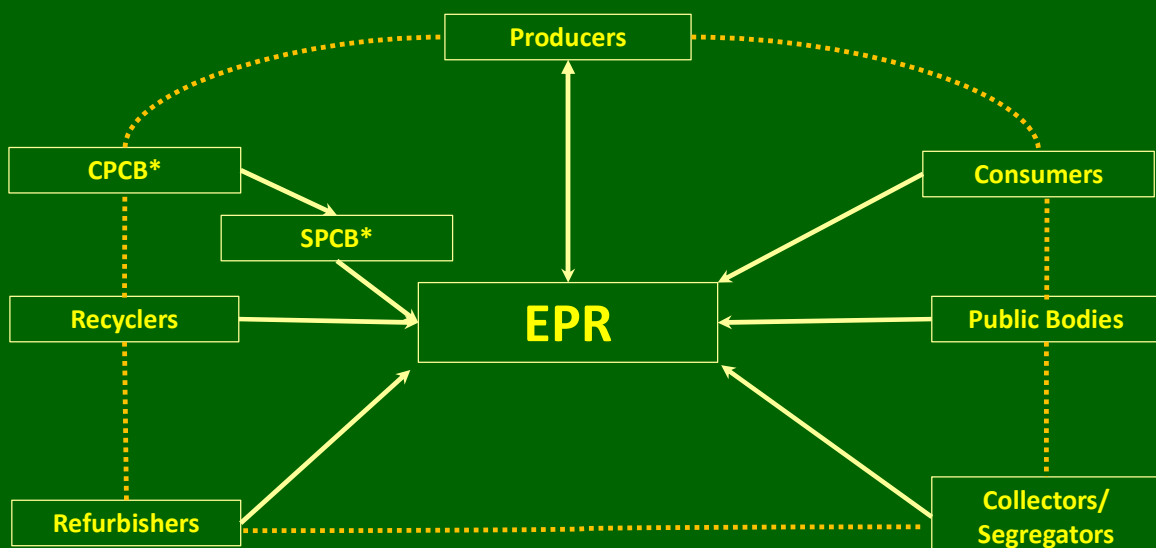
INDIA'S ELECTRIC MOBILITY MISSION (FAME*)



*Faster Adoption & Manufacture of Electric vehicles

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Battery Waste Management Rules-2022 EPR & Multi Stakeholder Responsibilities



*CPCB – Central Pollution Control Boards
*SPCB – State Pollution Control Board

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2. ZINC IN INDIA

Primary Production (tonnes)

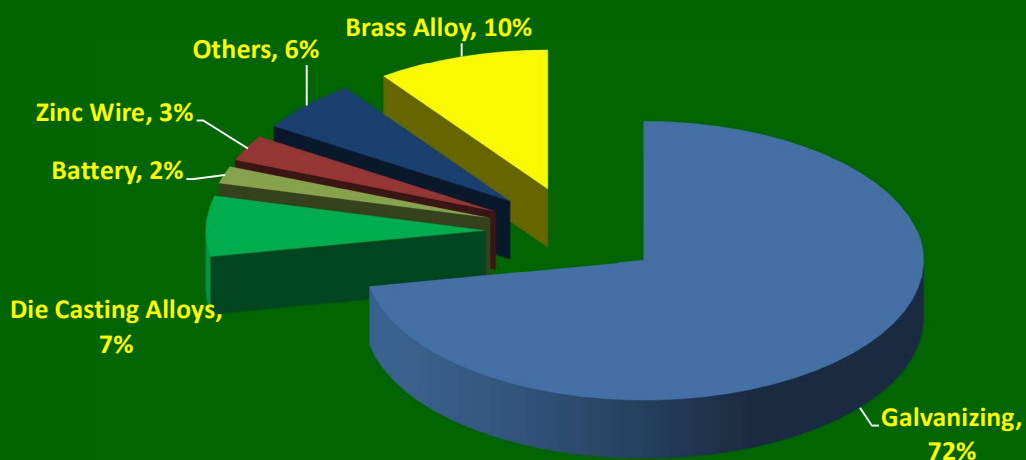
<u>Year</u>	<u>Production</u>
2019-2020	688000
2020-2021	715000
2021-2022	776000
2022-2023	821000



(Source: HZL)

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Sectoral Zinc Consumption



(Source: HZL)

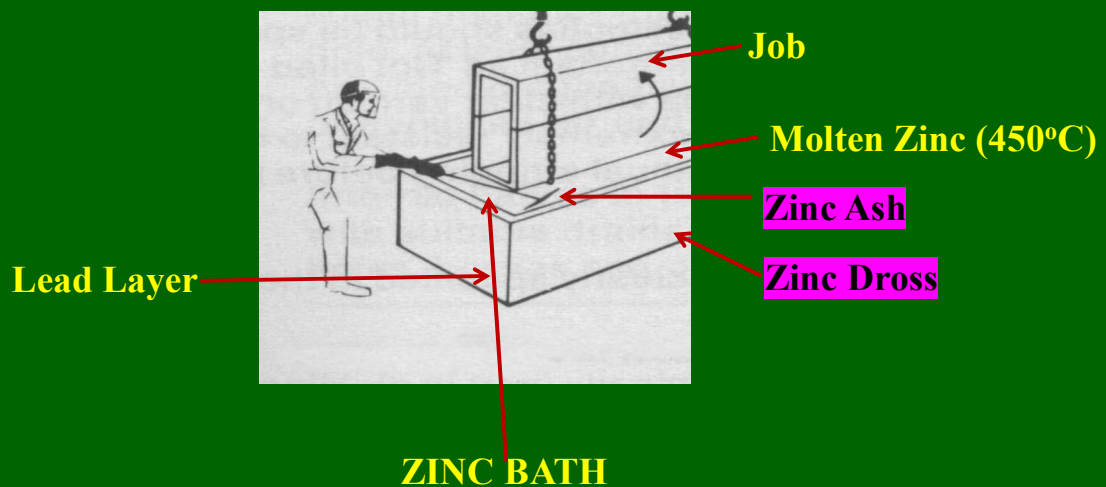
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Hot Dip Galvanizing



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Formation of Zinc Wastes



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Zinc Dross

- Steel (article) – Zinc reaction
- Free Iron & Iron Salts – Zinc reaction
- Steel (kettle) – Zinc reaction
- An Iron-Zinc Intermetallic Compound, FeZn_{13}
- Approx 94% Zinc & 6% Iron



- Raw Material for Manufacture of Zinc Oxide
- Zinc Oxide used in Rubber, Tyre, Paints, Pigments etc.,

Zinc Ash

- Surface oxidation of molten Zinc

Zinc Ash – Typical Composition

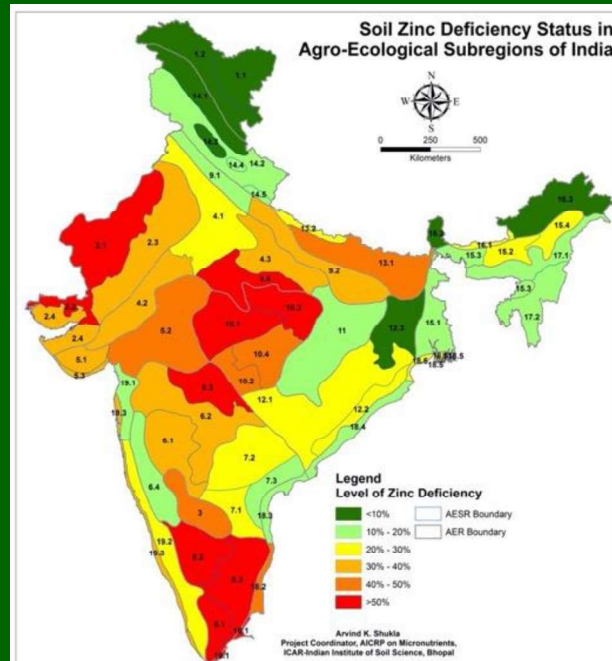
Zinc	50 – 75%
Lead	2 – 10%
Iron	1 – 6%
Aluminium	0 – 5%
Copper	0 – 5%
Chlorides	4 – 10%



- Raw Material for Manufacture of Zinc Sulphate, used in Agriculture as a Micronutrient

Extent of Zinc Deficiency in India

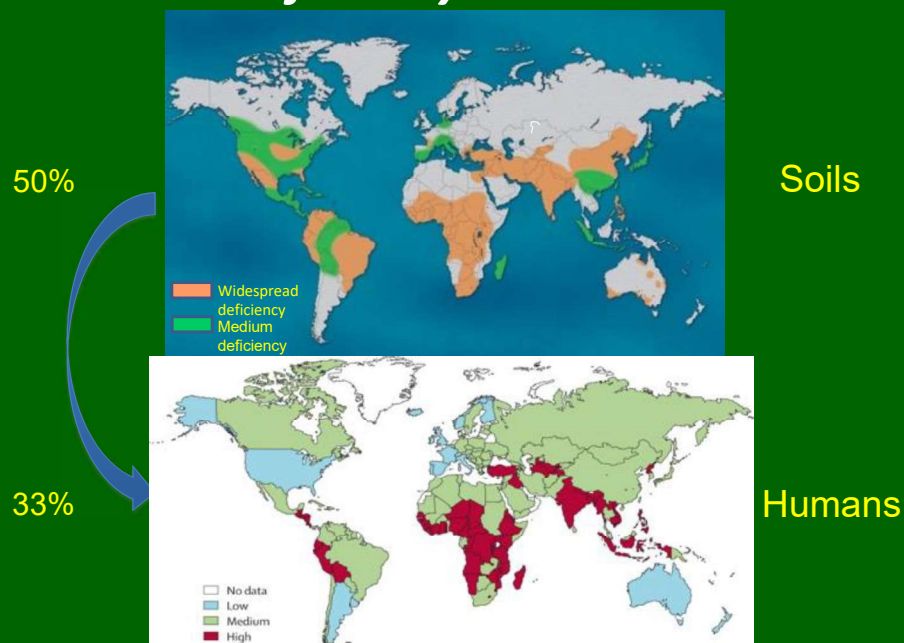
About 40% of Indian soils are Zn deficient



(Source: IZA)

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Zinc Deficiency in Soil Influences Zinc Deficiency in Humans



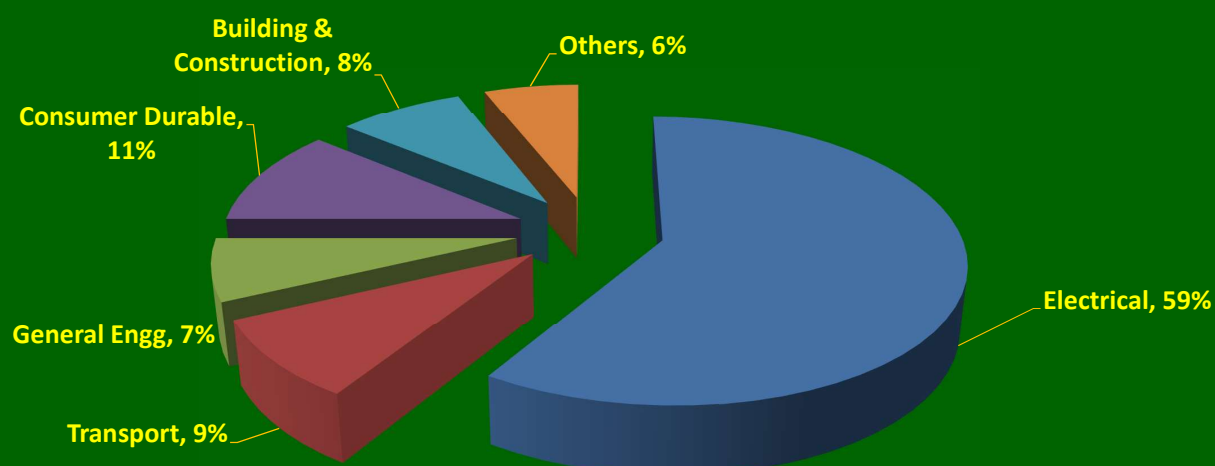
B.J. Alloway (2008) (Courtesy: IZA)

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3. COPPER IN INDIA (tonnes)

	2020-2021	2021-2022	2022-2023
Production	363,600	484,600	555,000
Import	150,200	134,100	175,700
Export	46,300	75,500	10,000
Usage	467,500	543,200	720,700

Sector-wise Copper Usage in India



Copper Scrap Imports & Domestic Availability (in tonnes)

Imports			
		<u>2021-2022</u>	<u>2022-2023</u>
1.	Copper Scrap & Waste	115222	133789
2.	Copper Alloy Scrap	86570	87607
3.	Domestic Availability		250000 (est)

Types of Scrap & Usage

- ***Process Scrap***
- ***End of Life Scrap***

Usage

- ***In Primary Production***
- ***Direct Melting***
- ***Secondary Tied & Closed***



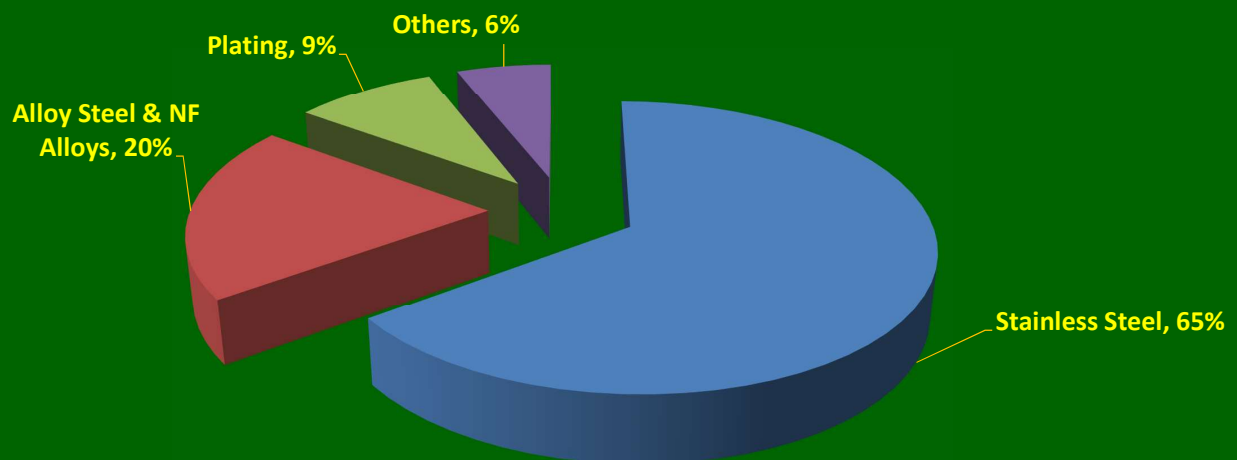
4. Nickel in India (in tonnes)

	2020-2021	2021-2022	2022-2023
Production	0	0	0
Import	56,551	51,527	49,061
Export	2,964	5,918	6,905
Consumption	53,587	45,609	42,157

(Source: Ministry of Mines; Ministry of Commerce)

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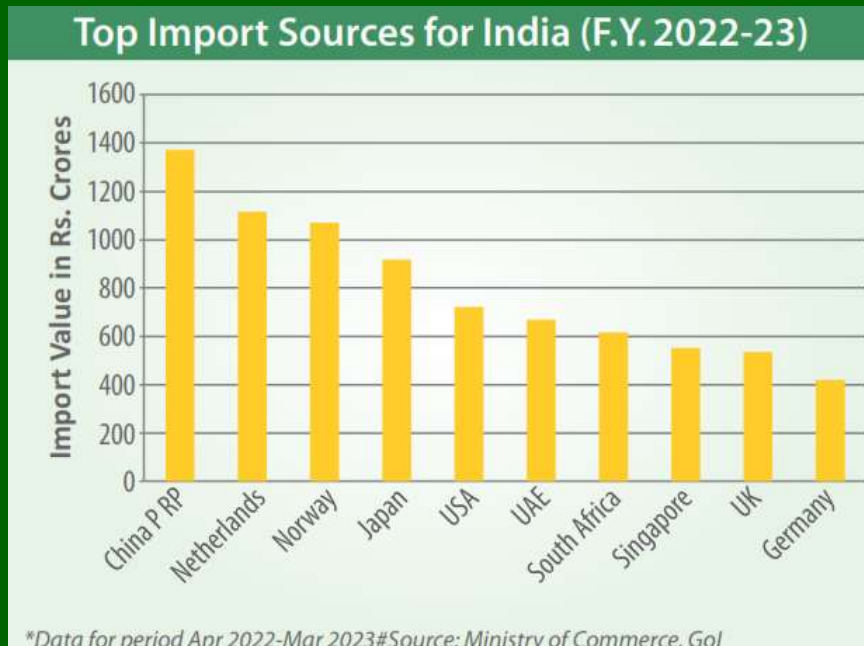
Sector-wise Nickel Usage in India



(Source: MCX)

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Imports



(Source: MCX)

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Way Forward

- **Wastes to continue growing**
- **Regulations & Safe Practices**
- **Fine tuning, if reqd.**
- **Stringent Monitoring & Implementation**
- **Industry Voluntary Initiative**
- **Citizens Social Responsibility (CSR)**
- **GREEN EARTH FOR FUTURE GENERATIONS**

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**Delhi
Welcomes You!**

ILZDA 30th
LEAD CONCLAVE

First Announcement

Third Edition

**INTERNATIONAL CONFERENCE ON
LEAD & LEAD BATTERIES
- ENGINEERING SUSTAINABLE GROWTH
7 & 8 Dec 2023, New Delhi**



(Glimpses of 2nd Edition New Delhi 2022)

in association with

Indian Battery Manufacturers Assn
International Lead & Zinc Study Group
International Lead Association
Consortium for Battery Innovation
Battery Council International
Bureau of Middle East Recycling
India Energy Storage Alliance
National Referral Centre for Lead Projects in India
Society for Advancement of Electrochemical Science & Technology
Recycling & Environment Industry Assn. of India &
The Indian Institute of Metals, Delhi Chapter

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INDIA LEAD ZINC DEVELOPMENT ASSOCIATION **ILZDA**

Email: ilzda.info@gmail.com; website: www.ilzda.com

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